

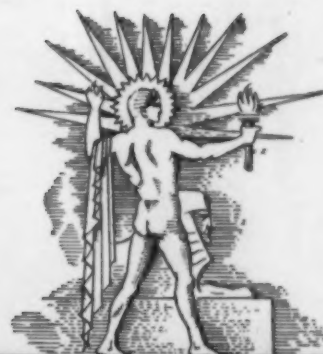
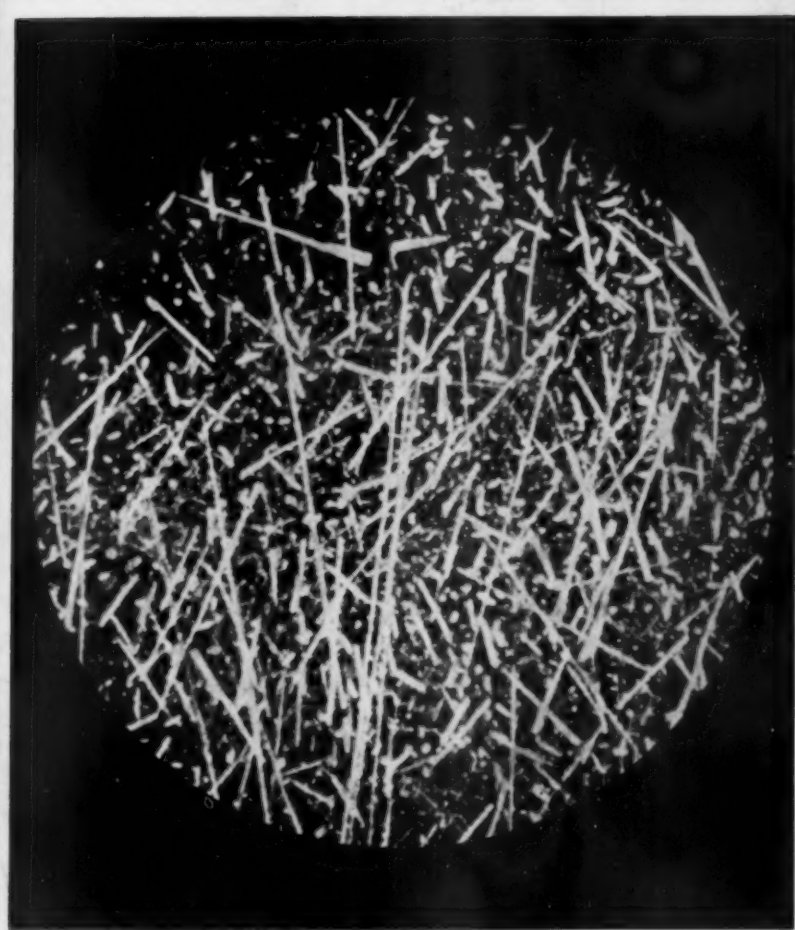
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SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE.



MAY 2, 1936

Atomic Disturbance

See Page 279

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The Weekly



Summary of

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DO YOU KNOW?

The building blocks of the great pyramid in Egypt averaged over two tons in weight.

One hundred rare species of orchids from the tropics of America have been added to Cornell University's collection.

Evergreens transplanted several times are most likely to thrive, because the successive plantings stimulate growth of small roots.

English farmers are responsible for most of the names of our domestic animals, such as ox and steer, but names for meats are mainly French.

The Field Museum has a fossil "fish-lizard" specimen with a tragic history; the British amateur who found it fifty years ago treasured it so that his wife became jealous and sold it, whereupon the man committed suicide.

"Painting the onion" is saving New York farmers thousands of dollars, when the painting consists of applying copper sulfate to muck soil to give the onions thick golden-brown skins instead of pale thin skins that onion buyers found objectionable.

Rats begin to breed when only three or four months old.

A new and speedy icebreaker for Russian icefields is designed with a caterpillar device in the prow.

The tiny baby of a blue whale is about 23 feet long, but it grows up to be 75 or even 100 feet long.

There is a monument to a hen at Little Compton, Rhode Island, placed there to commemorate the origin of the Rhode Island Red breed of chicken.

A New York State experiment station has prepared a list of fruits especially suited for sale at roadside stands and arranged in order of ripening time.

A new attachment for telephones is being tried in Vienna; using it, any one of fifty selected numbers can be instantly called by pressing a lever.

In trapping insects by electric light lures, it is found that efficiency of the light increases up to about 200 watts, but beyond that the glare keeps insects off.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

AGRONOMY

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ARCHAEOLOGY

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ASTRONOMY

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Why can't we see to the center of our own galaxy of stars? p. 285.

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How fast does an elephant's heart beat? p. 285.

What use has the body for carbon dioxide? p. 280.

Why does your face turn white from shock? p. 281.

PSYCHOLOGY-PHYSIOLOGY

Is vision in cats a single simple process? p. 288.

PUBLIC HEALTH

Where are tuberculosis deaths most frequent? p. 282.

PHYSICS

11,000,000-Volt Bullets for Use in Attacking Atoms

In Report to National Academy, Prof. Lawrence Tells Of Beam Equal to That From Radium Worth \$4,000,000

See Front Cover

THE production of 11,000,000-volt energy atomic bullets for use in attacking other atoms was announced by Prof. Ernest O. Lawrence, University of California physicist, at the meeting of the National Academy of Sciences meeting in Washington, D. C.

This is the greatest man-controlled energy that science has had at its command for use in its study of the problem of the constitution of matter.

Already young Prof. Lawrence has transmuted or blown to pieces most of the atoms known to man, using the cyclotron or giant merry-go-round machine gun, which he invented.

To the academicians he also told how he had devised a successful means of bringing beams of high-powered atomic bullets into the clear for purposes of bombarding matter.

The production of the new, high-energy bullets was made possible by substituting the nuclei of helium gas atoms for the hydrogen or heavy hydrogen formerly used. On theoretical grounds it was believed that these helium nuclei would function in the whirligig machine gun, and that because of their mass and double charge they should come out of the apparatus with double the energy previously attained with lighter, less electrically-active bullets.

Proved By Experiments

Experiments have now demonstrated this theory to be correct. Helium nuclei, also known as alpha particles, have been shot out of the machine with an energy of 11,000,000 electron-volts, in a beam of one-tenth micro-ampere.

With this new tool in their hands it is hoped that physicists will be able to make a new attack on the nuclear structure of the atom, and to discover new facts and new transmutation phenomena which so far have not even been thought about.

Along with this development, Prof. Lawrence announced changes in his cyclotron apparatus which make it possible to send a stream of high energy

bullets clear of the machine. In the laboratory such beams have been shot into the air for a distance of twenty-five centimeters, and with evacuated tubes this distance can be greatly increased. The importance of this accomplishment is in adding facility to experimentation with the powerful beams produced.

Broaden Biological Research

With the present status of the cyclotron apparatus, greater scope will be given to biological experiments on the effect of neutron rays upon living tissue. Preliminary studies have indicated that the neutron ray may be even more valuable in certain types of medical therapy than is the X-ray.

Transmutation of platinum, one of the noblest metals of the universe, and the creation of two elements new to science, radio-platinum and radio-

iridium, was also reported by Prof. Lawrence.

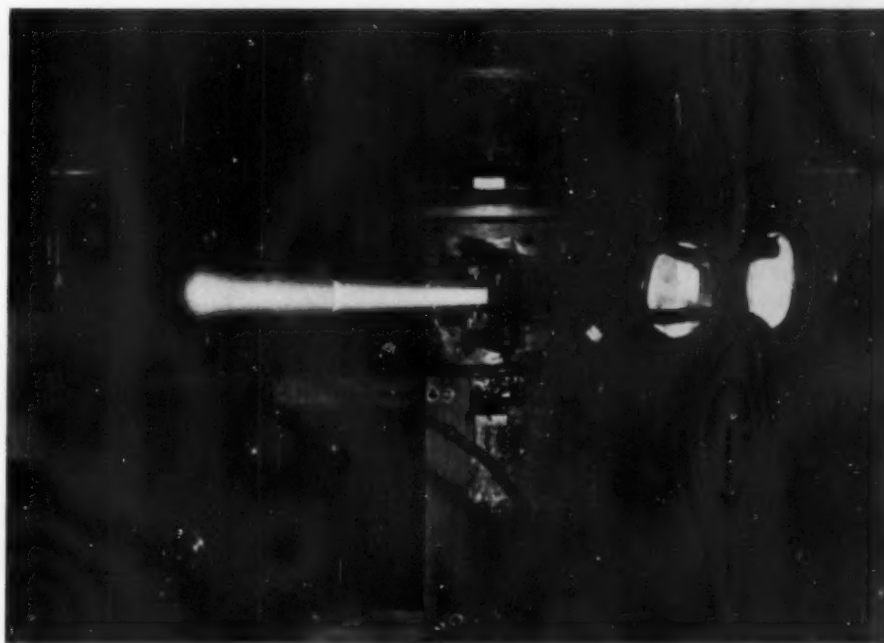
As projectiles in the transmuting bombardment, Prof. Lawrence and his cooperating colleague, Dr. J. M. Cork, utilized the cores of heavy hydrogen atoms, deuterons to chemists and physicists. Thus they made previously unknown varieties of matter through the use of a kind of atom, known as heavy hydrogen or deuterium, which was discovered as recently as 1931.

Produced By Cyclotron

The giant whirligig atom gun, with its 85-ton magnet, produced the 5,000,000-volt deuterons used. The virtue of Prof. Lawrence's famous apparatus, now copied in a score of other laboratories throughout the world, is that relatively low voltages are built up by series of mild electrical pushes into the extremely high voltages used.

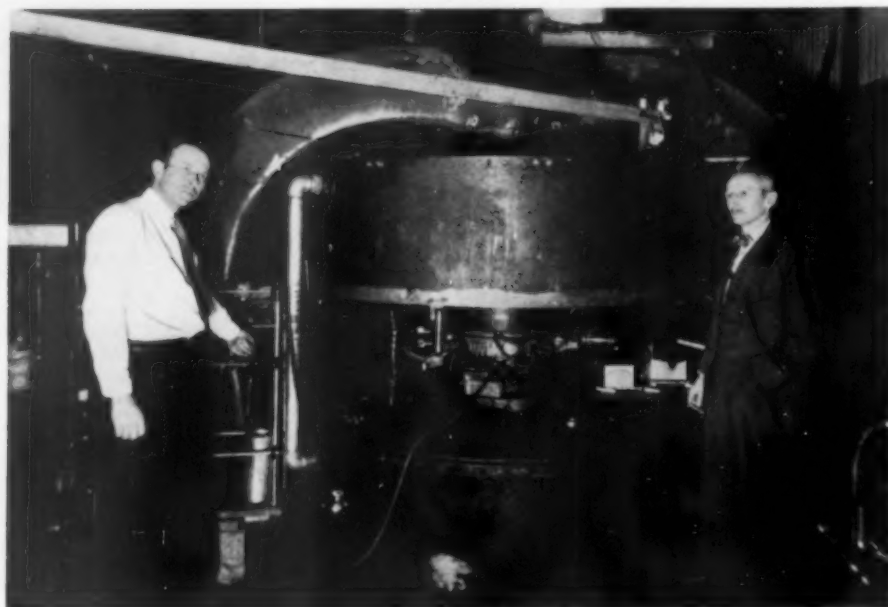
The new radioactive element varieties, called isotopes, were separated chemically from the platinum that was unchanged.

Prof. Lawrence told the academicians just what happened when the transmutation took place. When radio-iridium is created, a deuteron is captured by the core or nucleus of a platinum atom and an alpha particle, which is a helium atom core, is violently ejected. Radio-platinum was synthesized by a process



MOST POWERFUL BEAM OF RADIATION

Scientists marvel at this photograph. It is the most powerful beam of radiation man has produced. Shooting out from the Lawrence atom gun at University of California it makes a luminous beam nearly a foot long and rated at nearly 6,000,000 volts. Dr. Donald Cooksey, University of California physicist, took the photograph.



GIANT ATOM MERRY-GO-ROUND

Here is the powerful cyclotron or atom gun used for record-making high voltage experiments at the University of California. Note the great 85-ton magnet. Prof. Ernest O. Lawrence, who invented the powerful apparatus, stands at the left. Dr. Donald Cooksey, scientist working with Prof. Lawrence, is at the right.

that amounted to the capture of a fundamental building block of matter that is known as the neutron. And radio-platinum disintegrates into gold.

The picture on the front cover shows the great activity caused by a neutron beam from the Lawrence giant atom gun or cyclotron at the University of California. This cloud chamber was photographed in 1/1000 second by Dr. F. N.

D. Kurie. A multitude of hydrogen atoms are shown speeding after collision with neutrons, although the test chamber was a full six feet away from the giant machine. The photograph shows an effect equivalent to that which would be produced by one hundred grams of radium worth approximately \$4,000,000.

Science News Letter, May 2, 1936

PHYSIOLOGY

Carbon Dioxide a Vital Need; Once Thought Mere Waste

CARBON dioxide, commonly looked upon as nothing but a "waste" product of bodily processes, is "almost as essential to the normal functioning of the body as is oxygen."

This challenge to a long-established tradition of biology was thrown down before the meeting of the American Philosophical Society in Philadelphia, by one of the world's leaders in research on respiration, Prof. Yandell Henderson of Yale University.

True, carbon dioxide is a waste product of respiration, just as it is of the burning of coal, oil or wood; most of it must therefore be got rid of. But it is an error to think that any considerable residue left in the body is a poi-

son, Prof. Henderson contended. A certain amount is absolutely necessary, because carbon dioxide is "the normal stimulus to the circulation as well as to respiration."

Supporting evidence for Prof. Henderson's claim was found in troubles sometimes encountered with hospital patients going under anesthesia. Some patients breathe excessively in the early stages of anesthesia, and thereby decrease the carbon dioxide concentration of the blood. This condition, called *apapnia*, may result in failure of both circulation and respiration. This tendency to collapse is now counteracted and prevented by the inhalation of carbon dioxide, diluted with oxygen or with

air. Also, at the end of the operation, inhalation of carbon dioxide is now the accepted means of speeding up the elimination of the anesthetic and preventing difficulties with the patient's lungs. The same means of stimulating breath and circulation is now used in resuscitating victims of carbon monoxide asphyxiation, and as a better substitute for the time-honored method of spanking newborn babies who fail to start breathing.

The American Philosophical Society, whose annual meeting Prof. Henderson thus inaugurated, is the oldest scientific body in the United States. It was founded in 1727 by Benjamin Franklin, in the days when "philosophy" was considered as embracing all natural knowledge, and hence, as properly including all the sciences. In keeping with this tradition, therefore, the three-day meeting in the Philosophical Society's building, immediately alongside Independence Hall, featured discussions of historical, economic and literary matters, as well as an impressive array of strictly scientific papers.

Science News Letter, May 2, 1936

MEDICINE

New Detection Method for Dangerous Radium Poisoning

THE unfortunate victims of often fatal radium poisoning can now be studied and a new treatment applied through use of a new radioactivity detection method that is 10 to 100 times as sensitive as the older and usual methods. Dr. Robley D. Evans, Massachusetts Institute of Technology physicist, told the National Academy of Sciences of his new way of finding out how much radium the poisoned persons are carrying around in their skeletons.

Persons who drink radium water nostrums, or who submit to injections of radium chloride, as well as girls and others working in factories with radium and similar substances, sometimes get the reactive substances into their systems. There, fixed in the bones, such substances slowly disintegrate into lead, giving off a radioactive gas called radon and bombarding the body with penetrating gamma radiation which is so harmful that the victim often dies.

Dr. Evans used a sensitive kind of radiation detector that was developed during the present push of physicists to discover all about radiations and the make-up of atoms. His new type of "screen-cathode quantum counter" for detecting radium's gamma rays discovered radium in one fatal case that had

been erroneously reported as free from radium when the conventional electro-scope detector was used. The breath of patients can also be analyzed to determine how much radon emanation is being exhaled.

Treatment for radium poisoning by the methods used to treat lead poisoning

has been tried in collaboration with doctors at Harvard's Huntington Memorial Hospital. Used upon a typical case, it gave promising results. It consists of replacing some of the radium contaminated calcium in the patient's bones by fresh clean calcium through the use of special medication.

Science News Letter, May 2, 1936

CHEMISTRY

Powerful Explosive Made from Cornstarch By-product

Inositol From Farm Wastes Is Basic Material for Blasting Agent More Powerful than Nitroglycerine

AN explosive more powerful than nitroglycerine can be made from the corn product wastes of the nation, it was revealed by Prof. Edward Bartow, president of the American Chemical Society, in an interview at the Society's meeting.

No mere dream is the new explosive and blasting agent which outdoes dynamite in potency. Powder companies are already investigating the new material, and if the costs can be lowered America will not only find its corn a valuable industrial commodity in the explosives field but a line of defense in time of war.

Basic material of the new explosive is a sugar-like substance, inositol, made from the waste "steep" waters in which corn is soaked as a step in the manufacture of cornstarch. Inositol, said Prof. Bartow, can be converted into an explosive known as hexanitroinositol, containing six nitrogen atoms. Nitroglycerine is technically known by the chemical name of trinitroglycerine and has three nitrogen atoms.

The explosive hexanitroinositol, Prof. Bartow pointed out, has advantages over nitroglycerine because it is a solid compound instead of a liquid and can thus be used directly as a blasting agent, like dynamite. Its explosive properties are essentially the same as those of nitroglycerine.

Dynamite is useful because it is a solid material and can be more easily handled than a liquid explosive. The inherent disadvantage of dynamite, Prof. Bartow indicated, is that while it contains powerful nitroglycerine, the latter must be soaked up by sponge-like, non-reacting rare earths. Thus the solid dynamite is only part nitroglycerine. The rest is absorbent material.

The basic material inositol, from which such a super-explosive could be made, has been known for many years as a laboratory curiosity, said Dr. Bartow. It could be purchased on the open market in gram amounts for a cost of about \$500 a pound.

Working at the State University of Iowa, where he is chairman of the Department of Chemistry, Prof. Bartow and his assistant, Dr. W. W. Walker, have improved the process for making inositol, so that the cost per pound is only a fraction of the former price.

On a production basis demanded by the potential explosives market, the cost should be reduced to forty cents a pound, which would meet competitive figures, Prof. Bartow indicated.

Inositol is commonly but incorrectly called a plant sugar. Slight traces of it are found in the human body in the muscle and liver tissues. Its physiological significance to the body is yet unknown but the University of Iowa Medical School is now studying the problem.

Almost all the inositol in the world just now consists of a stock of 25 pounds, which Prof. Bartow keeps locked in a safe in his laboratory.

Science News Letter, May 2, 1936

PHYSIOLOGY

Shock Causes Ebb of Blood Turning Face White

SUFFERERS from shock, turning white as the proverbial sheet, have good physiological reason for their pallor. The blood from their cheeks, and the blood even more vitally needed elsewhere in the body, has ebbed into the smallest blood vessels, which have be-

come unnaturally dilated. Further, much of the fluid part of the blood has oozed out of the blood vessels altogether, and is in the other tissues, making them watery or "edematous." It is possible for a patient suffering from shock to "bleed to death into his own blood vessels."

These are the outlines of the physiological set-up of shock, as pictured before the American Philosophical Society by Dr. Virgil H. Moon of Jefferson Medical College.

All the tissues of the body have more than they need of capillaries, the microscopically fine, thin-walled vessels that connect the ends of the arteries with those of the veins. The muscles alone, Dr. Moon said, have capillaries enough to contain all the blood of the body. When shock occurs, these dilate, and also the tiniest of the vein-branches. Into the extra space thus created a great share of the blood ebbs. Furthermore, much of the plasma, or blood fluid, oozes out through the walls, leaving the remaining blood "thicker," or more concentrated.

The heart, not receiving the return stream of blood it normally should, cannot keep up the blood pressure. Body temperature drops, and the fires of life burn dangerously low.

Science News Letter, May 2, 1936

MEDICINE

Make Advance in Search For Monoxide Antidote

WHAT is claimed to be a marked advance in the search for an antidote for carbon monoxide poisoning was reported to the American Chemical Society by Drs. Samuel and Joseph Seifter of the University of Oklahoma Medical School.

In studies on rats, Drs. Seifter found an injection of the compound known as hexahydroferric chloride resulted in 75 per cent recovery after the animals had been poisoned with carbon monoxide gas. It is this gas which appears in the exhaust gas of motor cars and leads to deaths when drivers run their motors in closed garages.

The new antidote chemical, it was found, is too drastic in its action to be useful on animals higher in the scale of evolution than rodents. Already a search is being made for variations of the chemical which are less irritating and might thus be used for higher animals. The hope, of course, is that the new line of investigation will eventually lead to discoveries having applications to human beings.

Science News Letter, May 2, 1936

PUBLIC HEALTH

Tennessee Valley Presents Tuberculosis Mystery

Higher Death Rate Found in Kentucky and Tennessee Than in Any Other State Except Those with Resorts

A MYSTERY for tuberculosis and public health experts to solve exists in the Tennessee Valley area. The mystery is the excessively high tuberculosis death rate among white persons in that region. The situation was described by Dr. C. C. Dauer, Tulane University Graduate School of Medicine, and Dr. L. L. Lumsden, U. S. Public Health Service, at the meeting of the National Tuberculosis Association in New Orleans.

More tuberculosis deaths per 100,000 white population occur in Kentucky and Tennessee, these physicians found, than in any other state in the country except Colorado, New Mexico and Arizona, where the death rates are high probably because of the large numbers of tuberculous persons who go to those states from other parts of the country in search of climatic benefit.

An area of high tuberculosis mortality is found in central and eastern Tennessee and in western and northeastern Kentucky, shading off gradually in all directions from this central zone in two broad belts. The central zone had the comparatively high tuberculosis death rate of 92.6 per 100,000 white population while the average tuberculosis death rate for the United States is 57 per 100,000.

Drs. Dauer and Lumsden stated at the meeting that they could find no explanation for the high tb death rate in the Tennessee Valley area. Such factors as climate, economic status, occupation, rural and urban conditions, racial composition of the population, education, age, sex, and prevalence of other diseases were investigated, but gave no clue to the solution of the mystery.

A possible clue in the vegetation and soil content of the region was suggested by the two physicians in a report just published by the U. S. Public Health Service. The area of high tb death rate and the adjacent area of about average tb death rate lie in the southern portion of the Central Hardwood Forest, as shown on a forestry map of the Department of Agriculture. Farther south, in a region corresponding with the

Southern Forest Pine Lands, the tb death rate is much lower.

"Such a coincidence so far as it goes presents an interesting field for both speculation and practical research," Drs. Dauer and Lumsden state.

The difference in soil dusts, average sunshine and dew precipitation may influence the ability of the tb bacillus to survive outside the human body, they suggest. A difference in the living habits of the people, dependent somewhat on the trees of the region, is also pointed

MEDICINE

Home Better Than Institution For Protecting Child from TB

A CHILD can be better protected from tuberculosis by proper care in his own home than by spending a few months or a year in a preventorium. A study supporting this view was presented by Dr. Lewis J. Moorman of Oklahoma City at the meeting of the National Tuberculosis Association.

Figures from 18 years' experience at the Oklahoma City Tuberculosis Dispensary were cited by Dr. Moorman. During this period 1,156 children who would be considered eligible for preventorium admission were allowed to remain at home but were taught how to take care of themselves to avoid development of the active disease and were given as careful observation by the dispensary staff as possible. Of this number, only one child died of active tuberculosis while under observation.

This record, Dr. Moorman pointed out, bears out the experience of other physicians who have reported disappointing results of preventorium care and have even recommended its discontinuance.

The object of the preventorium is to give the child enough sleep, food and sunshine so that he can build up resistance to tuberculosis infection and thus avoid the development of active tuber-

culosis. It is designed for children exposed to continuous contact with tuberculosis in the family or those children already infected with the germs but not yet sick with tuberculosis. The objection to the preventorium is that, besides breaking up the family and being a large expense to the community, its effect is not sufficiently lasting. Whether the child is cared for in a preventorium or at home, ultimate success depends on teaching the child and his family to apply continuously necessary preventive measures.

Science News Letter, May 2, 1936

PALEONTOLOGY

15,000,000-Year-Old Fossils in Interior Asia

A NOTABLE find of fossils has been reported from the region of Lake Balkash in Kazakstan, near the Mongolian border. Especially noteworthy are skeletal remains of *Moropus*, a "missing-link" animal, between horse and rhinoceros, extinct some 15,000,000 years. The Institute of Evolutional Morphology and Paleozoology has sent an expedition to explore the deposits.

Science News Letter, May 2, 1936

MEDICINE

Vitamin D May Save Lives Of Trichinosis Patients

Disease Caused by Parasites in Under-Cooked Pork Responds to Vitamin Which Hastens Calcification

DOSES of vitamin D may be a means of preventing death and providing relief in trichinosis, if further experiments by Drs. Franklin D. Barker and Wayne W. Wantland, Northwestern University zoologists, prove successful.

Trichinosis is a painful and sometimes fatal disease caused by eating raw or under-cooked pork that contains trichina worms. The larvae of the worms make their way from the digestive tract to the muscles.

As it does with all foreign substances that enter the muscles, the body encloses these parasitic worm larvae with a coating of calcium as a protective measure. It takes from 10 to 15 months to do this. In the meantime, according to Dr. Wantland, "it seems quite probable that the more general symptoms of trichinosis, muscular pains, fever, etc., are, in part at least, due to toxic products formed by the breaking down of large amounts of muscle tissue together with waste products of the larvae. Thus a continuous inoculation of the infected host with toxins occurs."

Vitamin D, in the form of irradiated ergosterol, definitely hastens the calcification of the trichina cysts in the muscle fibers during the critical stage of trichinosis in rabbits, Dr. Wantland found. He is now trying to accomplish the same results with the use of the vitamin in higher animals and eventually in man.

Speed Calcification

Making use of the property of vitamin D to stimulate calcium absorption from the intestines and calcium deposition in the body, as is done in rickets, the zoologists have brought about calcification of cysts containing the parasitic larvae in from 5 to 6 weeks.

They are now trying to determine whether the calcified cysts in the muscle fibers have any deleterious effect on higher animals. There is a possibility, it was pointed out, that the particles in the tissues may decrease efficiency.

"It is significant that the majority of deaths from trichinosis occur from four to six weeks after infection, during that period immediately preceding, or during the earlier stages of cyst formation,"

Dr. Wantland said. "It would seem then that if cyst formation and subsequent calcification could be hastened this would shorten the critical period in trichinosis and more quickly terminate the disease.

"The treatment of trichinized rabbits with irradiated ergosterol apparently has a definite therapeutic value. It still remains to be tested in human cases of trichinosis."

Science News Letter, May 2, 1936

ENTOMOLOGY

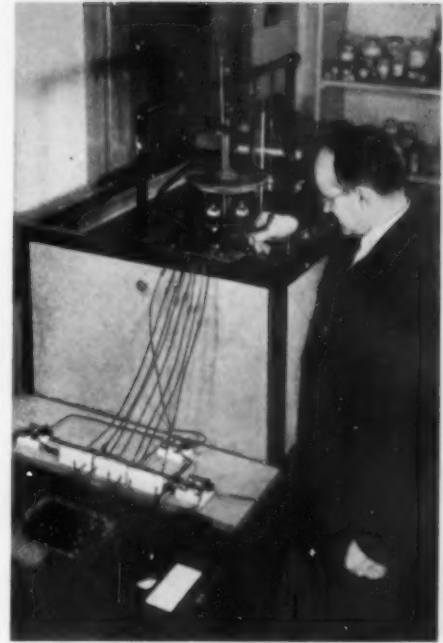
Change From Grub to Moth Given Scientific Study

BUTTERFLIES coming out of the cocoon have long been favorite springtime nature-study objects to show to wondering children.

Until now, scientists have paid relatively little attention to the physiological processes that accompany the change from dormant pupa to the winged, active butterfly or moth that emerges. They knew, of course, that the seeming death was not real; the pupa or chrysalis was not dead but only asleep. But the details of the waking, in the greatly changed form, have until now not been adequately investigated.

However, researches at present in progress at Brown University have begun to clear away some of the mystery and bid fair to bring more facts into the daylight. Prof. Ivon R. Taylor, of the department of biology, is applying the methods of chemistry and physics to large numbers of moth pupae, and is learning some of the secrets of the really active life that goes on beneath the surface of the rigid, sarcophagus-like chrysalis-case while the animals are so still that they appear dead.

Prof. Taylor uses bee-moths as his "insect guinea pigs," because they are very easy to raise in large quantities and easy to handle under laboratory conditions. Results obtained with them, however, can be assumed to apply reasonably closely to the larger, showier species of moths and butterflies. Bee-moths are small insects, only about half an inch in



MOTH CALORIMETER

Prof. Ivon P. Taylor of Brown University with the sensitive apparatus that measures the amount of heat given off by the body of a single moth chrysalis.

length. They are best known as parasites on bee colonies, where their strange appetite—they feed only on beeswax—makes them a destructive and dreaded pest. But that very adaptation to crowded living, and the ease of feeding them, makes them also quite valuable in the role of experimental animals.

Life-processes go on more rapidly at the beginning of pupation in males, but in females more energy is released toward the end of the period, Prof. Taylor found from very delicate tests of heat given off by the pupae. To measure this heat evolution, a special micro-calorimeter was devised. It is so sensitive that it can measure accurately the heat given off by a single pupa. One of these "moths-in-the-making" gives off enough heat during a week to raise a quarter of a thimbleful of water from freezing to boiling temperature.

The chemical changes that go on during the change from larva to full-grown moth, with wholly new sets of body parts, are necessarily very great. The pupating insect practically "digests itself," as Prof. Taylor puts it. The rate of carbon dioxide indicates that there is a high utilization of fat, of which the larvae store a good deal in their bodies, in the release of energy. Other chemical tests show that during the entire process the body fluids remain acid.

Science News Letter, May 2, 1936

PHYSIOLOGY

Smoking Dulls Taste For Salt and Sweets

IF YOU reach for a smoke, you will not be able to taste your sweet very well.

Smoking tobacco dulls the acuteness of taste for both sugar and salt, it has been found in experiments conducted at Catholic University of America, by Dr. John E. Rauth and James J. Sinnott. But the effect is not permanent; when the smoking is stopped, the ability to taste returns to normal.

Six habitual smokers who planned to give up smoking for a period volunteered as subjects in the experiment. Tests were used to determine the weakest solution of sugar and of salt that could be tasted by each one. Then they stopped smoking. Their taste became more acute, so that they could taste solutions of sugar only about half as strong as their former limit. Salt could be tasted in solutions about two thirds as strong as formerly.

The test is keen. Two of the individuals sneaked in a couple of smokes during the non-smoking period. Their taste for sugar betrayed them.

Non-smokers tested as a check on the experiment were very much like the smokers during their non-smoking period.

Science News Letter, May 2, 1936

PHOTOGRAPHY-ASTRONOMY

Amateur's Photo Developer Useful to Astronomers

THE popularity of miniature cameras among amateur photographers has proven a benefit to the astronomer. With these tiny cameras a very small picture is taken which can be enlarged many times, and special developers have been invented to reduce the size of the clumps of silver in the negative, which form the "grain." Using older developers these grains have been so large that they were readily apparent if an enlargement of only four or five diameters was made.

In order to obtain the finest possible details in astronomical photographs, it has been necessary to use "slow" plates which required prolonged exposures, as these showed smaller grains. Dr. W. W. Morgan, of the Yerkes Observatory, reports (*Astrophysical Journal*,) that he has used these special "fine-grain" developers with extremely fast plates and short exposures, to obtain results equal to those obtained previously with slow

"Process" plates. His experiments have been made with photographs of the spectra of stars, obtained by analyzing their light through a spectroscope, but it is likely that the fine-grain developers would also be of use for direct photography of the heavenly bodies.

Speeding up the exposures is important to astronomers not only because of the saving of time, which permits a single instrument to be used several times as often but also because with the same exposure as previously much fainter objects can be recorded.

Science News Letter, May 2, 1936

PHYSICS

Cosmic Rays Investigated In Airplane Flights

LATEST evidence as to the nature of powerful cosmic rays that bombard the earth from outer space was presented to the National Academy of Sciences by Dr. R. A. Millikan, California Institute of Technology physicist and Nobelist. New observations were made by cosmic-ray recording electroscopes carried upon many airplane flights in Peru and Manila up to altitudes which reached in some cases two-thirds of the way to the top of the earth's atmosphere.

On both sides of the earth, Dr. Millikan reported in his joint paper with Drs. H. V. Neher and Serge A. Korff, the ionization effect of the cosmic rays rises as a function of the altitude. The only difference between this relationship in the equatorial regions and in the older figures for the temperate and polar zones is that absorption coefficient is slightly less near the equator.

Recalling the differences in interpretation of research results that have led some investigators, notably Dr. A. H. Compton of Chicago, to conclude cosmic rays are mostly minute particles (electrons) instead of very short wavelength radiation (photons) as Dr. Millikan holds, Dr. Millikan said:

"These facts remove the most cogent arguments that have recently been used for the assumed great predominance of the electronic over the photonic component of the cosmic rays as they enter the earth's magnetic field. In the present state of our ignorance, however, they do not in themselves entirely remove the possibility of assuming, as some have wished to do, that the incoming rays consist only of charged particles. They merely render this assumption one of considerably less probable validity."

Science News Letter, May 2, 1936

IN SCIENCE

CHEMISTRY

Oxygen in Air Heavier Than Oxygen in Water

A NEW explanation of the startling fact that the oxygen in the air man breathes has a different chemical weight from the oxygen in the water man drinks was offered to the meeting of the American Chemical Society at Kansas City.

Dr. Malcolm Dole of Northwestern University described his recent experiments which show that the air-oxygen is heavier by six parts in a million than is the oxygen in water.

The discovery has important implications in showing why the earth has quantities of the new-found heavy hydrogen isotope known as deuterium and why this heavy hydrogen has not been detected in the sun, said Prof. Harold C. Urey, Nobel prize chemist of Columbia University, in commenting on Dr. Dole's report.

"The difference in atomic weight between air-oxygen and water-oxygen seems to be due to an exchange of oxygen isotopes between air and water in the lower regions of the stratosphere where the temperature is fifty degrees below zero Centigrade; the heavier isotope of oxygen of mass 18 becoming somewhat more concentrated in the air than in the water," explained Dr. Dole.

Science News Letter, May 2, 1936

MEDICINE

Vitamin C Helps TB Patients but Is No Cure

DOSES of anti-scurvy vitamin C given in pure form, or of orange juice in which the vitamin occurs naturally, improved the condition of tuberculosis patients, Drs. Molly Radford, Eugene de Savitsch and Henry C. Sweany of Chicago reported at the meeting of the National Tuberculosis Association.

The vitamin is in no sense a cure for the disease, the Chicago physicians stated. They used it in addition to the routine rest regimen their patients were receiving in a sanatorium. The reported improvement of the patients as compared with controls who received no extra vitamin C was indicated by laboratory tests, particularly of the blood.

Science News Letter, May 2, 1936

NEW FIELDS

EVOLUTION

Muscle Pull Produced Backbone, Scientist Says

OUR remote ancestors, in the fish stage of evolution, had to work for the privilege of having a backbone. Muscle pulls helped to develop the genuine spinal column of bone possessed by the higher fishes, out of a mere rod of cartilage, Dr. William K. Gregory of the American Museum of Natural History told the American Philosophical Society at its meeting.

Further interaction between evolving animals' ways of life and the bodily equipment handed to them by heredity account for other developments of the skeleton, especially the shoulder-girdle and pelvis, and the limbs attached to them. Dr. Gregory illustrated his discussion with a series of skeletons mounted by his associate, S. H. Shubb.

Science News Letter, May 2, 1936

ASTRONOMY

"Clouds of Chaos" Hinder Sight of Milky Way's Core

DARK "clouds of chaos" hang like impenetrable curtains between us and the center of the great wheel-shaped aggregation of stars of which our sun is a minor member. We cannot see all the way to the heart of our own "home" galaxy.

How far away these clouds of dark obscuring substance are, has been a matter of measurement lately, by Prof. Joel Stebbins, director of the Washburn Observatory, University of Wisconsin, working at Mount Wilson Observatory in California with Drs. C. M. Huffer and A. E. Whitford. At the meeting of the American Philosophical Society in Philadelphia Prof. Stebbins outlined some of the results of their efforts.

They used as "standard lights" a thousand stars of one particular type, very hot, and some of them with a thousand times the intrinsic brightness of our sun. These stars can be identified by analyzing their light in a spectro-scope, so that if they are partly dimmed by intervening matter, the quantity of that matter present can be estimated by

the diminished brightness of the stars.

"The distance to the center of the galaxy in the constellation Sagittarius is estimated to be about 30,000 light years," said Prof. Stebbins, "but the inter-stellar dark matter shows strong absorption at distances of 3,000 or 4,000 light years, so that we can see only a fraction of the distance to the center. As the bright clouds of stars are seen in the open spaces between the absorbing material, or the clouds are in front of the main absorption, the distances to the clouds can be estimated."

Science News Letter, May 2, 1936

PHYSIOLOGY

Elephants' Heart-Beats Half as Rapid as Humans'

ELEPHANTS' hearts beat less than half as fast as human hearts. Their beat averages only 30 per minute; the human rate is 72 per minute.

A study of elephant heart rates, obtained by using a specially constructed vacuum-tube apparatus on 37 full-grown female Indian elephants, was reported to the American Philosophical Society, by Dr. Francis G. Benedict and Robert C. Lee, of the nutrition laboratory of the Carnegie Institution of Washington, located at Boston.

The elephants, which weighed from four to four and one-half tons each, were studied as they stood quietly feeding. There was a considerable deviation from average rate, just as there is among other animals. The slowest-hearted elephant recorded only 22 beats per minute; the most nervous (and occasionally troublesome) specimen ran up a rate of 39 a minute.

When the elephants were lying down, the rates were higher, Dr. Benedict continued. Occasionally the increase was only one or two beats per minute over the standing rate, but usually it was from eight to ten beats higher. This is contrary to the findings with all other animals, which have higher heart rates when standing.

Heart rates, among all animals, vary according to size. In general, the smallest animals have the highest rates.

"The canary has been reported to have a rate of 1,000 beats," said Dr. Benedict, "and the large domestic animals show rates of 40 or 50 beats. The elephant with a rate of about 30 beats, fits perfectly into the picture, being the largest animal and having the lowest heart rate of any of the animals thus far studied."

Science News Letter, May 2, 1936

METEOROLOGY

Record-Breaking Drought Already Grips Southwest

RECORD-breaking drought already grips the Southwest, as week after week has gone by with little or no rain.

The seriousness of the situation is disclosed in a survey of crop and weather conditions up to mid-April, made by the U. S. Weather Bureau. J. B. Kincer, chief of the section on climate and crop weather, summarizes the outlook:

"In much of this area precipitation since the beginning of the year has been unprecedentedly small. In Kansas, the period from January 1 to date has been the driest of record, with only 30 per cent of normal rainfall for 3½ months; April so far has had only about 20 per cent of normal. Also in Oklahoma the period has been much the driest of record, with only approximately one-fifth of the normal rainfall; the previous driest, 1910, had 60 per cent more precipitation than has occurred this year to the middle of April.

"Texas has had only 37 per cent of normal for the entire period and 10 per cent of normal for April up to the present time; only once of record, 1909, has there been less rainfall for the year up to this time. In Missouri, the first 3 months of 1936 were the driest since 1918, when there was slightly less rainfall; it has been the second driest of record."

Science News Letter, May 2, 1936

ARCHAEOLOGY

America's Oldest Weapons Handy Combination Tools

AMERICA'S oldest stone weapons, the famous Folsom spear points, served a dual purpose in their day.

So Dr. H. C. Shetrone of the Ohio State Archaeological and Historical Society told the central section of the American Anthropological Association.

These Folsom points, some of which figured in American bison hunts estimated at 10,000 years ago, were used as tips for spears to be hurled when needed, but for ordinary occasions they served as knife blades, Dr. Shetrone has concluded.

What has generally been called a groove, down the flat side of the Folsom stone weapon, Dr. Shetrone says, would better be designated in stone-craft technique as "fluting." The Folsom points, he declares, were thus fluted knife blades.

Science News Letter, May 2, 1936

MEDICINE

Play for Health

Hospital for Juvenile Patients Considers That Games Take Their Place With Medicine in Restoring Health

By JANE STAFFORD

CAN you imagine children sick in bed playing "Farmer in the Dell" or "I Sent a Letter"?

That is what the children in the wards of Children's Memorial Hospital in Chicago do, and apparently they enjoy these and similar games as much as healthy, active youngsters in school or on the playground. And, although the children may not know it, the games represent more than just play. They are real aids in hastening the children's recovery.

Maybe you never thought of play as a remedy to help sick children get well fast. The doctors and nurses at this Chicago hospital, however, have found that it can be a valuable part of the treatment for their small patients. Children's Memorial has incorporated play as an integral part of the nursing and treatment of its patients.

For a long time kindly ladies have gone to children's wards in hospitals to play with the children, read to them and otherwise amuse them. Occupational therapy and school lessons have likewise been a part of the program for children confined to a hospital bed for long periods. But the play program at Children's Memorial Hospital is different.

Play there is not just "something tacked on after the physical care has been attended to," and it is not merely entertainment, explained Miss Anne Smith, director of play at the hospital—Play Lady to the children.

Sick Generally Deprived

The hospital staff find that play is almost as necessary for the child's development as food, drink and physical care. Of course, that applies to well children as well as sick ones, but the well children manage to get the necessary play while those in hospitals are generally deprived of it. Even at home, a sick child may be missing out on play, especially if he is a child in a home where no one has time or knows how to play with him.

The play is arranged to suit the various children and their physical condi-

tion just as medicines and other treatment are prescribed, and the nurses at the hospital are taught play technic just as they are taught how to take temperatures, give baths and otherwise care for their small patients. Most of the young women entering the hospital's School for Pediatric Nursing have never had any contact with children. The student nurse may have been an only child in a family herself, and her unfamiliarity with children and feeling of strangeness may make it difficult for her to handle the little patients. Play, she soon finds, makes it all much easier, but first she must learn how and what to play.

Nurses Must Play

A course of play is consequently required of every student nurse at this hospital. The student has eight lessons in which she learns how to play without any equipment. She learns how to interest and soothe the child with stories and poetry, how to play finger and singing games with him, and how to start the whole group playing a game or acting a favorite story.

The games are all social games. None of them is competitive, as that would entail too much of a strain for sick chil-

dren. They are the kind that children of all ages can play together, since the children are grouped in the wards not according to age but according to the kinds of illnesses they have. Even little children with heart disease, whose physical activity is greatly limited, can join in such games as "Farmer in the Dell." The child's imagination fills in the action quite satisfactorily.

Folk Games Used

Folk games of all countries are drawn on for the play program. Although many of the little patients are children of foreign-born parents, the games are generally new to them. They have rarely been taught the social type of games. Many of these children are used to playing Tarzan and gangster at home. At the hospital, they learn the new ones with delight and when they return home they do not forget them, and the hospital is remembered as "the place where they play with you."

One object of the play is to make the child feel at ease.

"Many children come to the hospital with strange fears of doctors, nurses and hospitals which are magnified by the odor of ether, the sight of the nurses from the operating room who look like ghosts in their all-white garb and masks, and of doctors wearing strange instruments around their necks and foreheads," Miss Smith observed. (The Play Lady and her volunteer assistants who



GAMES IN THE WARD



REQUIRED COURSE

Nurses must learn to play and to lead their charges in games that will help the children back to health and strength.

supplement the nurses wear cheery yellow smocks.)

Too often a threat of doctor, nurse or hospital is used by parents to frighten children into obedience, so that they are terrified when they actually find themselves in a hospital. But play is a familiar and important part of normal child life and the play which starts almost as soon as the young patients are put to bed in the hospital ward makes them feel at home and unafraid.

An interesting feature of the play is the way it is used for children who come to have their tonsils out or for other operations. All these patients are gathered in a sun room at eight in the morning of the operation. The room is as far removed from the operating room as possible, so that all sight, sound and smell of it are avoided. In this sun room the whole group plays together. Nurses come at intervals of from five to twenty minutes, taking the youngest children first, but the rest go on playing until their turn comes. As a result they are content and calm until the last minute before their operation.

Tonsils Out Peacefully

"It was really astounding," said one of the nurses, "to see how many children could have their tonsils removed peacefully and even happily because of this preliminary play experience."

Group play has been going on at Children's Memorial Hospital since 1932. As a result, frightened, homesick children crying themselves into a fever are

unknown there. Nurses find that their small charges quickly stop crying and resisting the various necessary treatments and care when stories are told or games are played while the unfamiliar and therefore frightening procedures are being carried out. Neurotic tendencies, which are so apt to have their beginnings in long illnesses of children, are prevented by the play program, the staff at Children's Memorial Hospital finds. Bad habits are prevented or forgotten when group play is part of the life at the hospital.

Atmosphere Changed

"The whole atmosphere of a hospital is changed," Miss Smith said. "One visiting doctor from the East seeing all the alert happy faces in our hospital claimed we had no sick children. We know that a hospital full of wan-faced irritable children is unnecessary and should cease to exist."

Although the play program does not depend on toys, the children have playthings to amuse themselves with also, and these are fitted into the play program as much as possible.

Visitors to the little patients at this hospital are familiar with a table full of toys which have been carefully selected as suitable for sick children. The toys are displayed in the reception room on visiting days, as a guide to parents and other visitors in selecting just the right toy or game to amuse some sick little boy or girl.

Just any toy that takes your grown-up

fancy—even a very handsome and expensive toy—may not be the correct one to give to a child who must play with it in bed. So if you are planning a visit to a sick child, or if you are one of those generous persons who donates toys to children's hospitals, Miss Smith's selection, based as it is on science and long experience, may be helpful to you.

Simple Toys

Psychologists agree that children's toys should be simple and need not be expensive. Many of the toys selected by Miss Smith can be purchased at the ten-cent stores. The reason for this is partly to spare the pocketbook. Another important reason is that if the toy or book becomes contaminated—it may fall on the floor or the child using it may develop a contagious disease—a clean duplicate can be easily provided and the young owner need not suffer the pang of having to discard his favorite plaything. Only new toys are acceptable at hospitals, where no chance can be taken on the young patient picking up even a cold "germ" to add to his physical suffering.

The beautiful woolly dog or the fetching stuffed doll are also on the "don't give" list. Stuffed toys cannot be cleaned, and toys for sick children, especially in a hospital, must be cleanable.

Don't give playthings that will drop out of the child's high hospital bed and break. Avoid also the toys that have sharp edges or other features that may injure the child when he plays with them. You may be amused by pop-up books, but the sick child will not be, and he may even be frightened by them.

The weight and size of both books and toys should be considered. Large heavy books and toys are more tiring than enjoyable for the child who is flat on his back and whose small arms are already weakened by illness. Small books with plenty of pictures and large type are ideal gifts for sick children.

No Scrap Books

It may surprise you to learn that the scrap book for which you have been collecting pictures all year will not bring much joy to the sick child for whom it was lovingly made. They have but momentary interest for the child. For one thing, the scrap books are invariably too large and heavy and the child is bewildered by all the pictures, rather than entertained. If you feel you must give scrap books, give small, lightweight and empty ones which the child can fill himself, if he wants to.

Blank books with crayons are better than the usual type of drawing book which has pictures to be copied or outline drawings to be filled in by the child. Children like to make up their own designs or to choose themselves the subjects to paint or model.

Modeling clay will bring much happiness to small patients. Another favorite and approved plaything at Children's Memorial Hospital is a bean bag game consisting of a cat's head on cardboard, with cut-out mouth forming a hole to throw the bean bags through. Very small patients amuse themselves by just putting the bags through the mouth, without using any throwing motion. Larger ones throw the bags, and the exercise incidentally may be made part of the muscle treatment in certain cases. The bean bags should be small, fairly light weight, and of course made of washable, durable material.

Playthings must be selected with regard to the young patient's particular ailment or state of progress on the road to health. Balls cannot be given to heart disease patients because the throwing

motion is forbidden to these children.

Heavy pull toys, wagons, tricycles and the like, are entirely unsuitable for bed patients and even for some convalescents. For children recovering from broken bones or joint operations—what the doctors call orthopedic cases—these toys may, on the other hand, be helpful in that stage of the treatment where muscles are to be strengthened and muscular control regained.

Another bit of advice: if you are giving toys to hospital children on any extensive scale—taking enough for a number of children rather than for the one small patient you may be interested in individually—get in touch with the director of the hospital before you make your selections. Some institutions might not welcome modeling clay, for example. Other institutions, such as an eye and ear hospital or an orthopedic hospital, would be delighted with heavy pull toys.

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Science News Letter, May 2, 1936

PSYCHOLOGY-PHYSIOLOGY

Cats Have Two Kinds of Sight; Brain Cortex Needed for One

CATS have two kinds of sight. When they use their eyes to make a "forced landing" on all four feet as an obstacle is shoved at them, that is one kind of vision. They have to use their brains for that—the special part of the brain cortex known as the visual area.

They have another kind of sight when a menacing paw makes a pass for their eyes. The quick natural blink that follows when bright light on the eye is interrupted by a threatening shadow does not depend upon the brain cortex. This almost instantaneous signal from sense organ to muscle may be short-circuited through a more primitive part of the nervous system.

That these two kinds of seeing are entirely different and are controlled by

different parts of the nervous system, Dr. Karl U. Smith, of Brown University, Providence, R. I., told members of the New York Branch, American Psychological Association.

This intricate division of labor in the nervous system was revealed by experiments on cats that had lost the parts of the brain cortex which control vision. Although nothing was wrong with the eyes of these cats, they might be considered blind as judged by ordinary standards. They could not find their way to food. They could not climb stairs, or jump from a table.

But these "blind" cats would still blink at a threatening movement near their eyes, provided, however, that the cats were in a bright light. The opening of the pupil of the eye is made still smaller when the cats are brought from dim light into a bright glare, just as it is in normal animals. They still make compensating movements of their eyeballs when they see objects revolving around them.

But these "blind" animals could no longer place their legs to jump or land on an approaching surface.

Apparently there is a critical division of labor between the nervous mechanisms controlling the eye movements alone and those controlling the body and legs in response to objects seen, Dr. Smith concluded. In the normal cat, these mechanisms work together in perfect harmony and cooperation. But cats lacking entirely the visual cortex of the brain keep a rudimentary capacity to avoid objects and threatening gestures.

Science News Letter, May 2, 1936

ASTRONOMY

Solar System Unstable After Great Lapses of Time

THE solar system, idealized, was looked upon with the eyes of a mathematician, Prof. George D. Birkhoff of Harvard, who told members of the National Academy of Sciences that "ultimate instability is highly probable." He reassured his listeners, however, with the statement that "this instability would only arise after enormous lapses of time."

Applied to the solar system in which we live, this would mean that even if the sun does not hit another star or burn itself out, it and its family of planets will probably fly asunder in the remote future.

Prof. Birkhoff is not concerned with the real solar system, however, but with the problem of "the general formally stable motion of a dynamic system" which he concludes in the general case must be that of actual instability.

Science News Letter, May 2, 1936

MEDICINE

Pioneer in Lung Surgery Wins Trudeau Medal

FOR introducing the life-saving chest operation, thoracoplasty, into America, Dr. Edward A. Archibald of McGill University, Montreal, was awarded the Trudeau Medal of the National Tuberculosis Association.

The operation which Dr. Archibald introduced is the most drastic of the procedures used to treat tuberculosis by "lung collapse therapy." The operation consists of removing all or nearly all the ribs on one side as close to the spinal column as possible. The result is that the chest muscles of the side and back, formerly held in place by the arch of the ribs, contract and compress the afflicted lung so that the patient cannot breathe with it. This places the lung at complete rest and closes up the tuberculous cavities, thus speeding the cure.

Science News Letter, May 2, 1936

23 LANGUAGES

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ASTRONOMY

Farewell Photo of Anteros To Help Return Prediction

A FAREWELL photograph of Anteros, the newly discovered baby planet, was taken on April 11 with the giant 100-inch reflector at the Mount Wilson Observatory, according to an announcement issued by the Harvard College Observatory. This last observation, taken when the magnitude of the object was only 20.5, is considered of exceptional value by astronomers because it gives them great "leverage" in calculating the planet's orbit exactly and thus is an important clue as to when the body may return to the neighborhood of the earth.

Anteros, only one-third of a mile across, is at present about one hundred million miles from earth, having crossed the orbit of Mars. On February 7 it was little more than one million miles distant, the nearest of any asteroid or

other celestial body except the moon. At that time it was receding at the rapid rate of a million miles a day but it has now slowed down to approximately half that speed.

Within a year, astronomers estimate, its speed of recession will have diminished to zero and it will then turn around and come back toward the sun—and earth—with steadily increasing speed.

The Mount Wilson photographs were measured by Dr. Seth B. Nicholson and the results communicated to Harvard Observatory, announcement station for the western hemisphere, by Dr. Walter S. Adams, director of the California station. He also sent observations taken March 12 and March 27 which indicate that the planet has closely followed preliminary predictions.

Science News Letter, May 2, 1936

ENGINEERING

New Instrument Predicts Mine Roof Cave-ins

A NEW device to detect mine roof cave-ins and the type of disaster which occurred at Moose River, N. S., has been developed at the Pennsylvania State College.

The frantic and spectacular rescue efforts to save the lives of the two men trapped at Moose River emphasize anew the hazard which roof collapse brings to mining operations and recall the fact that 50 per cent of all deaths in well-kept commercial coal mines occur from this source.

Dr. H. Landsberg of the School of Mineral Industries has found that in all roof cave-ins so far studied a definite break occurs in the overhead rock strata several hours before the final cave-in takes place. The shale and dirt, he found, support the roof for some time after the supporting rock has gone beyond its breaking point.

Secret of success of Dr. Landsberg's device is to detect the initial break in time to warn the working miners. His instrument is called a convergence recorder. From its use can be made pre-

dictions much like those a weatherman may make after reading the barometer. The apparatus consists of two steel tubes which slide inside one another like the tubes on a trombone. The sliding tubes are kept apart by a spring and are placed in the mine so that one tube touches the roof and the other the floor of the shaft. A movement as small as 1/100 of an inch between roof and ceiling can be detected.

Following the initial break, Dr. Landsberg points out, the rates of convergence of the roof and floor increase rapidly until the entire mine roof collapses. By studying the rates of convergence, the exact time at which the internal rock structure was broken can be detected and the final cave-in predicted.

Further work is being done along this line by both Dr. Landsberg and the U. S. Bureau of Mines in an effort to establish a more definite relationship between the rates of convergence of the roof and floor of a mine, and the collapse of the roof structure.

Science News Letter, May 2, 1936

RADIO

May 3, 2:15 p. m., E.S.T.

TESTING FABRICS WE BUY—Warren E. Emley, of the National Bureau of Standards.

May 12, 2:15 p. m., E.S.T.

OVER-OCEAN AIR SERVICE IN THE MAKING—Edward P. Warner, Aviation Consultant.

In the Science Service series of radio discussions led by Watson Davis, Director, over the Columbia Broadcasting System.

MEDICINE

"Silver Salve" Kills Germs; No Harm to Tissues

A "SILVER SALVE," slowly releasing infinitesimal soluble particles of a silver salt to kill bacteria in infections, was described as a new healing agent by Prof. John H. Müller of the University of Pennsylvania in an address before the meeting of the American Philosophical Society.

Silver bullets were reputed to be able to kill evil-doing witches in olden times; more modernly, silver is used in various forms to kill evil-doing germs. Silver nitrate and argyrol are among the most familiar of these antiseptic forms of silver in current use.

However, all known forms of silver have certain disadvantages. They are apt to irritate the delicate mucous tissues even while they banish the bacteria; and once in a while one hears a report of a case of "argyria" resulting from massive doses—a condition in which the skin and eye-white are permanently discolored, and become painfully sensitive to light.

To keep the advantages of silver as a germ-killer and yet avoid these drawbacks, Prof. Müller of the University of Pennsylvania has developed his new method of medical application, for a silver compound hitherto unused. This is anhydrous oxide of silver, which Prof. Müller mixes intimately with an oily substance. Applied to an infected area, this silver salve gradually releases the infinitesimal particles of the germ-killing metal, which dissolve and attack the disease organisms without harming the tissues.

The new method of silver medication has been tried extensively, both on laboratory animals and on human patients, Prof. Müller stated, and always with satisfactory results.

Science News Letter, May 2, 1936

PALEONTOLOGY

Cat-fight 50,000,000 Years Ago Left Sabre-Tooth Scar

A CAT-FIGHT occupied the attention of the American Philosophical Society at its meeting in Philadelphia.

The fight came off 50,000,000 years ago, more or less, but its outcome still has plenty of interest about it.

Scientists crowded round, when Drs. W. B. Scott and G. L. Jepsen of Princeton University exhibited the skull of a cat-like animal with a gaping but partly healed wound in it, that had undoubtedly been inflicted by one of the terrible weapons of a giant sabre-tooth cat that roamed the West when the West was really wild. Dr. Scott said:

"This has to do with the skull of the cat-like *Nimravus*, which was discovered by the Museum of the State School of Mines at Rapid City, South Dakota, and was sent in for inclusion in this report.

"The skull, which is that of a rather small animal, considerably smaller than a puma but somewhat larger than a lynx, shows a terrible wound through the forehead. This wound was inflicted in the lifetime of the animal, as is shown by the deposits of secondary bone around the edges of the gap. No doubt externally the wound was completely healed before death.

"The great interest of this remarkable specimen is the confirmation it gives to the interpretation of the sabre-toothed cats which had been reached by most students of the problem, as to the manner in which the great sabres could have been used. The whole structure of the skull shows that the lower jaw could be dropped to an extraordinary degree and the mouth opened so widely as to admit the points of the great sabres.

"The sabre-toothed cat would then strike with the head a stabbing blow, in just the same way that a venomous snake strikes. That is the only possible explanation of the manner in which the great tusks were used; and yet it is so completely unlike anything among existing mammals that many have received it with skepticism.

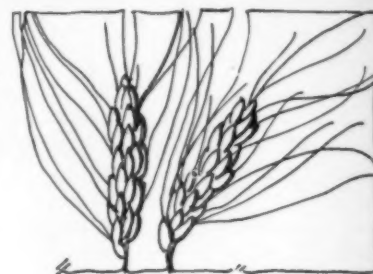
"The wound in the skull in question was clearly made by the sabre of the great contemporary sabre-toothed cat, *Eusmilus*, and was obviously made as an incised or punctured wound, not by a sharp point drawn across the skull. The sabres of *Eusmilus* fit this wound, and thus afford a most interesting confirmation of a theoretical deduction."

Science News Letter, May 2, 1936



REAPING A HARVEST NO MAN HAD SOWN

Among the devices used to obtain seed of native grasses for the re-sodding of lands in the West plowed into wheatfields during the tragic mistaken years of "normalcy" before the Depression and the Drought, was this strange device mounted on the back of an old Dodge truck, that had to be driven "wrong-end-to" while in operation. It looks weird—but it got the seed.



New Harvests

GRASS is the only thing that will really conquer the dust storms of the West, that have been appearing as an ominous portent even in the skies of the East. But the old native-grass sod has been destroyed by scores of thousands of acres, plowed out to make room for the wheat farms that met disaster in the drought. It will replace itself only slowly, and usually after one or more generations of weeds. What to do about it?

Botanists and agronomists of the U. S. Department of Agriculture have decided that human aid can re-sod the areas that need this protection much more rapidly than the slow processes of nature would do it, if left to themselves. Recently Burton F. Kiltz of the Soil Conservation Service, whose regular station is at Salina, Kansas, right out in the middle of the problem, told a Washington audience of plant scientists what has already been accomplished, and what is in immediate prospect.

One of the toughest jobs the soil-binding army has to face is the getting of an adequate supply of seed of the right kind of grasses. It seems to be fairly well agreed that the best species in sight are the ones that made up the old original carpet of the prairies and plains. In a recent 55-day drought and hot spell, test plantings of four cultivated grasses all died, while five comparison plots of native species came through all right. That would seem to settle any reasonable question.

There are still areas where these grasses grow undisturbed and bear their plummy harvests of seed. Harvesting this seed has proved no easy task. The machinery used for cultivated crops could be adapted to gathering seeds of

some of the species, though the yields, measured only in pounds per acre instead of in the accustomed bushels, look a bit small at first. Some of the harvest had to be gathered laboriously with sickles, or even with shears. But it must be remembered that these are very precious seed.

In all, the Soil Conservation Service harvested about 700,000 pounds of the seeds of native Western grasses during the last growing season. Some of this goes to immediate re-sodding, a part to propagation plots, where more seed will be harvested next fall—it is hoped at lower cost.

One species, and one of the most valuable of the grasses at that, does not yield a satisfactory harvest of seed. Buffalo grass, the joy of old-time Western cattlemen, gave up only about ten pounds of seed per acre on good test areas. However, buffalo grass is fairly easy to propagate in another way. It sends out runners that root at the joints, more or less like strawberry plants. So the re-sodders simply dig up truckloads of the sod, transport it to the places where it is to be planted, and tramp fist-sized chunks of it into the loose soil. There it takes root, and the runners do the rest. Presently, instead of a field of deadly drifting dust, you have a stretch of well-stabilized sod, where cattle can again make a living.

Science News Letter, May 2, 1936

GEOGRAPHY

Franklin's Descendant Seeks His Gulf Stream Map

A DESCENDANT of Benjamin Franklin appeared recently before a leading scientific society which his illustrious ancestor founded in 1727, to enlist aid in seeking a scientific chart which the same ancestor had caused to be made in 1769, when Franklin was a kind of predecessor of the Hon. James Farley.

The society is the American Philosophical Society. The descendant is Franklin Bache, well-known Philadelphian. The chart was of the Gulf Stream. The job Franklin held when he caused it to be made was Deputy Postmaster of His Britannic Majesty's Colonies in America—which Franklin was to forfeit half a dozen years later, when he stood in Independence Hall, only a few steps from the spot where his descendant stood, and told his fellow-signers of the Declaration of Independence, "Now we must all hang together, or we shall all hang separately!"

When Benjamin Franklin had that lost chart made, he was doing what his successors in high executive office might well profit by imitating: he was applying science to the tasks of his department, to make it more efficient.

Mails from England were somewhat slow in reaching America in the 1760's—sometimes two weeks slower than American merchant ships making the same crossing. Citizens complained of poor postoffice service, just as they do today. Franklin learned from a Nantucket whaling skipper named Folger that the obstinate British ships' captains bucked right into the Gulf Stream and

so lost much time, while the "slick" Yankee masters found a way around the troublesome current.

Thereupon Postmaster Franklin had an engraving made, of a chart showing where the Gulf Stream flowed, and indicating how it might be avoided or taken advantage of, according to the direction your ship was sailing. Presumably a large number of charts were printed from this plate, yet none of the great map collections can show a copy, Mr. Bache said. He appealed to his fellow members for any assistance they might be able to give him in his search.

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• First Glances at New Books

Natural History

THE TEACHING OF NATURE STUDY AND THE BIOLOGICAL SCIENCES—Harrington Wells—*Christopher*, 333 p., \$4. This is a book which every teacher of elementary biology will want. Besides giving a great deal of condensed information on both subject matter and teaching method, it tells where to turn for further information and where to send for laboratory materials and supplementary literature. It should save the teacher hours of puzzlement (all too frequently ending in frustration, at that) and should result in the solid enrichment of offerings to the class.

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Chemistry

A SYSTEMATIC HANDBOOK OF VOLUMETRIC ANALYSIS—Francis Sutton, rev. by A. D. Mitchell—*Blakiston's*, 631 p., \$10. The twelfth edition of a well-known British book on quantitative analysis. Among the new sections are those on gas analysis and potentiometric titration, but microchemical titration is not presented because of lack of space.

Science News Letter, May 2, 1936

Public Health

OBSERVATIONS ON INDIAN HEALTH PROBLEMS AND FACILITIES—Joseph W. Mountin and J. G. Townsend—*Govt. Print. Off.*, 47 p., 10c. Public Health Bull. No. 223. A vivid, if somewhat depressing, picture of health and living conditions among the one-time healthy native race of this continent is given in this report of the federal health service.

Persons interested in social problems, as well as those whose interest is primarily in public health or in Indians, will want to read the report.

Science News Letter, May 2, 1936

Microscopy

THE STUDENT'S MANUAL OF MICROSCOPIC TECHNIQUE—J. Carroll Tobias—*Amer. Photographic Pub. Co.*, 210 p., \$2.50. This book fills a place that has been waiting for it a long time. Most works on its subject are for the seasoned research worker, or at least for the advanced student. Something not quite so elaborate and exhaustive was needed for those nearer the beginnings of their careers in the microscope-using sciences.

Science News Letter, May 2, 1936

Botany

BOOK OF CACTI (ILLUSTRATED) FOR THE AMATEUR COLLECTOR: Vol. 1.—*Lawson Cactus Garden, San Antonio*, 545 varieties listed, \$1. Each variety listed is matched on the opposing page by a good, clear half-tone illustration. This publication should be useful to cactus fanciers as well as to dealers in these increasingly popular plants.

Science News Letter, May 2, 1936

Diet

THE BALANCED DIET—Logan Clendenen—*Appleton-Century*, 207 p., \$1.50. Sane and sensible advice on diet in health and disease in which scientific facts are made palatable by the spice of Dr. Clendenen's style.

Science News Letter, May 2, 1936

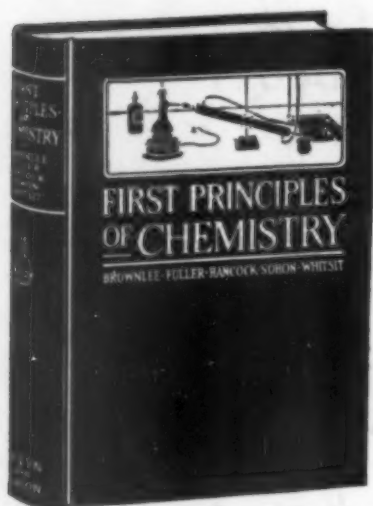
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THE REWARDS OF CHEMISTRY

THE year was 1884. Professor Frank M. Jewett of Oberlin College, standing before his class in Chemistry, declared:

"The man who makes aluminum available for commercial use will be a benefactor to the world. He will also be able to lay up for himself a great fortune."

Charles Martin Hall, one of the class who heard Professor Jewett's statement, took up the challenge.



In less than a year after his graduation in 1885 he hit upon a method of passing a current from a weak battery through molten cryolite in which aluminum oxide had been dissolved. Expectant, but fearful, he dipped an iron spoon into the cooling solution. When he drew it out, a dozen globules of aluminum glistened on its surface.

The experiment was a success. Rushing over to the college from the laboratory, he shouted, "Professor, I've got it!" On that day, February 23, 1886, just fifty years ago, the aluminum industry was born.

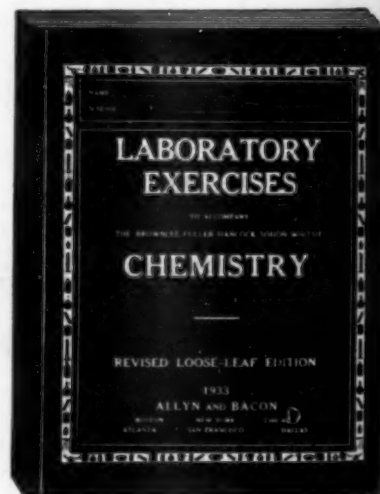
Hall's Electrolytic Process, which has long outlived its patents, is still used today for the large scale production of aluminum. It makes possible

the manufacture of thousands of articles, from new pans to airplanes. By it aluminum can be produced from bauxite ore at twenty cents a pound. It cost eight dollars a pound when Hall began his research.

The process brought fame and fortune to its discoverer and great benefit to mankind. Thus was Professor Jewett's prophecy fulfilled. Charles Martin Hall left a great fortune to his alma mater when he died.

Chemistry will continue to hold out new challenges and new rewards to the inquiring mind.

The ideal textbook in Chemistry tells the stories of great discoveries, gives accounts of the lives of great chemists, and points the way to new and even greater achievements.



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